Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

HHS Public Access

Author manuscript

Am J Ind Med. Author manuscript; available in PMC 2022 March 01.

Published in final edited form as:

Am J Ind Med. 2021 March ; 64(3): 208–216. doi:10.1002/ajim.23204.

Mental Health Stigma and Barriers to Care in World Trade Center Responders: Results from a Large, Population-Based Health Monitoring Cohort

Jonathan DePierro, PhD[1], **Sandra M. Lowe, MD**[1], **Peter T. Haugen, PhD**[2], **Leo Cancelmo, BA**[1], **Jamie Schaffer, BA**[1], **Clyde Schechter, MD**[3], **Christopher R. Dasaro, MA**[4], **Andrew C. Todd, PhD**[4], **Michael Crane, MD**[4], **Benjamin J. Luft, MD**[5], **Jacqueline M. Moline, MD**[6], **Denise Harrison, MD**[2], **Iris G. Udasin, MD**[7], **Adriana Feder, MD**[1], **Steven M. Southwick, MD**[8,9], **Robert H. Pietrzak, PhD MPH**[8,9,10]

[1]Department of Psychiatry, Icahn School of Medicine at Mount Sinai, New York, NY, 10029, USA

[2]New York University Grossman School of Medicine, New York, NY, 10016, USA

[3]Department of Family and Social Medicine, Albert Einstein College of Medicine, Bronx, NY, 10461, USA

[4]Department of Environmental Medicine and Public Health, Icahn School of Medicine, New York, NY, 10029, USA

[5]Stony Brook WTC Wellness Program, Stony Brook University, Stony Book, NY, 11725, USA

[6]Department of Occupational Medicine, Epidemiology and Prevention, Northwell Health, Rego Park, NY, 11374, USA

[7]Environmental and Occupational Health Sciences Institute (EOHSI) Clinical Center, Rutgers University, Piscataway, NJ, 08854, USA

[8]Department of Psychiatry, Yale School of Medicine, New Haven, CT, 06510, USA

[9]Department of Social and Behavioral Sciences, Yale School of Public Health, New Haven, CT, 06510, USA

[10]U.S. Department of Veterans Affairs National Center for Posttraumatic Stress Disorder, VA Connecticut Healthcare System, West Haven, CT, 06516, USA

Abstract

Corresponding Author: Jonathan DePierro, PhD, Icahn School of Medicine at Mount Sinai, New York, NY, 10029, USA, jonathan.depierro@mssm.edu, Phone: 212-241-8462.

Authors' contributions: Conceptualization and Methodology, J.D., A.F., R.H.P., & C.S.; Data Analysis, J.D., R.H.P, & C.S.; Writing – Original Draft Preparation, J.D., S.M.L., & R.H.P.; Final Approval of Version to be Published, J.D., A.F., R.H.P, M.C., A.C.T., J.M.M., B.J.L., S.S., S.M.L., J.S., L.C., D.H., P.T.H., and C.R.D.; Agreement to be Accountable for All Aspects of Work, J.D., A.F., R.H.P., S.M.L., M.C., A.C.T., J.M.M., B.J.L., S.S., D.H., P.T.H., J.S., L.C., and C.R.D.; Project Administration, A.F. and R.H.P.; Funding Acquisition, R.H.P. and A.F.

Institution where work was performed
Icahn School of Medicine at Mount Sinai, New York, NY

Institution and Ethics approval and informed consent: The project was approved by the Mount Sinai Program for Protection of Human Subjects, and all participants provided written consent for their health information to be used for research.

Disclaimer: *None*

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Background.—Nearly 20 years after the terrorist attacks of 9/11/01, multiple studies have documented the adverse mental consequences among World Trade Center (WTC) rescue, recovery and cleanup workers. However, scarce research has examined mental health stigma and barriers to care in WTC-exposed individuals, and no known study has examined whether rates of endorsement may differ between police and "non-traditional" responders, the latter comprising a heterogeneous group of workers and volunteers.

Objective.—To identify the prevalence and correlates of mental health stigma and barriers to care in WTC responders.

Methods.—Mental health stigma and barriers to care and their correlates were examined in 6,777 police and 6,272 non-traditional WTC responders.

Results.—Non-traditional responders endorsed more stigma/barriers to care concerns than police responders. Within a subsample who screened positive for a psychiatric disorder, police were more likely than non-traditional responders to endorse "Concerns that negative job consequences might result" (17.9% vs. 9.1%), while non-traditional responders were more likely to endorse "I don't know where to go to find counseling services" (18.4% vs.6.6%). Within this subsample, a mental health service need and more severe WTC-related PTSD symptoms were associated with increased likelihood of endorsing stigma or barriers; and pre-9/11 psychiatric history and non-Hispanic Black race/ethnicity were associated with lower likelihood of endorsing stigma or barriers.

Conclusions.—Results of this study underscore the burden of mental health stigma and barriers to care in WTC responders, and highlight the need for targeted interventions to address these concerns and promote mental healthcare utilization in this population.

1. Introduction

World Trade Center rescue, recovery and cleanup workers ("WTC responders") comprise a heterogeneous group of over 70,000 individuals representing multiple occupational groups. These groups include "traditional" professional responder roles, such as police officers and firefighters, and "non-traditional" roles, such as utility and construction workers, cleaners and volunteers [1]. While many studies have examined the prevalence and correlates of WTC-related posttraumatic stress disorder (PTSD) trajectories in WTC responders [2, 3], little research has examined mental health stigma and barriers to mental health care in this population [4]. This gap is striking, not only given the high prevalence and chronicity of mental disorders documented in this cohort [5], but also because of a robust parallel literature documenting considerable mental health stigma and barriers to care concerns in veterans and military service members [6, 7].

Mental health stigma, which includes a negative self-view for having mental health distress, concerns about being viewed negatively by others[8], and difficulties with practical barriers to care, such as not knowing where to access help, are commonly reported in trauma-exposed samples [6, 7, 9]. One prior study, conducted by the WTC Health Registry, involved a self-report survey of 9,803 WTC-exposed individuals. Within this sample, 47.7% of whom were rescue and recovery workers, barriers such as financial costs, attitudinal concerns (e.g., fear of what others would think) and access to care (e.g., scheduling conflicts) issues were found

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

to increase as a function of mental health symptom severity, as indexed by the presence of symptoms and self-rated functional impairment [4]. Forty-five percent of individuals with the highest symptom severity who had not been in mental healthcare in the past year endorsed an attitudinal barrier, and 24.5% endorsed an access to care barrier. While this study provides important insight into possible mental health stigma and barriers to care concerns in WTC survivors, it did not examine differences between responder groups in perceptions of stigma and barriers to care. Meta-analytic work with non-WTC samples has documented that 33% of traditional first responders, including police, endorse mental health stigma, and 10% endorse a barrier to care [9]. Yet, rates and predictors of endorsement among non-traditional responders, who as a group had little or no mass casualty disaster experience at the time of 9/11/01, remain largely unknown. Given that non-traditional responders have been found to have greater pre-9/11 psychiatric complaints and WTC-related PTSD symptoms, increased likelihood of suicidal ideation, and more self-rated mental health service needs than police responders [2, 5, 10], it is especially critical to characterize mental health stigma and barriers to care concerns in this population.

In the present study, we sought to characterize the prevalence and correlates of stigma and barriers to care in a large, population-based, health monitoring cohort of police and non-traditional WTC responders. Mental health stigma and barriers to care concerns were assessed during their first annual health-monitoring visit at federally funded WTC Health Program (WTCHP) Clinical Centers in the New York-New Jersey metropolitan area. In doing so, we present what is, to our knowledge, the largest occupational sample in which mental health stigma and barriers to care have been studied. We hypothesized greater endorsement of stigma and barriers to care in police compared to non-traditional WTC responders; and that these differences would be more pronounced when examining subgroups of responders who screened positive for WTC-related PTSD, depression, and/or alcohol misuse. Expanding on prior work by the WTC Health Registry [4], we also examined predictors of stigma and barrier endorsement within WTC responders who screened positive for a psychiatric disorder. Within this subsample, we predicted that several demographic factors (including female gender), lower symptom burden, prior mental health symptom exposure and endorsement of actual mental health service need would be associated with lower likelihood of endorsing any concerns of mental health stigma or barriers to care.

2. Materials and Methods

2.1 Participants

Data were gathered as part of a larger study on trajectories of WTC-related Posttraumatic Stress Disorder (PTSD) symptoms in WTC responders [2]. In the present study, we included 6,777 police and 6,272 non-traditional World Trade Center rescue, recovery and clean-up workers who attended their first, no-cost health monitoring examination with the World Trade Center Health Program, hospital-based clinics on average 5.0 years (SD=2.3; range: 1–12) after 9/11/01. The sample was predominantly male, identified as non-Hispanic White, had high school or higher level of education, were married or partnered, and engaged in some or only paid work on the WTC effort (See Table I). Within the non-traditional responders, half (50.1%; n = 3,142) were either construction/extraction or installation/

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

maintenance/repair workers (39.1% and 11.0% respectively); other occupations, including transportation services workers (8.8%; $n = 511$) each represented less than 10% of that sample. The project was approved by the Mount Sinai Program for Protection of Human Subjects, and all participants provided consent for their health information to be used for research purposes.

2.2. Measures

All measures were obtained at participants' first WTCHP health monitoring visit.

2.2.1. Demographics.—Demographic characteristics (including age, marital status, race/ethnicity, income level and education) and WTC responder group data were extracted from questionnaires completed during the first health monitoring visit. As described in detail elsewhere [2], the WTC responder group was created by dichotomizing job roles into police (primarily comprised of New York City police officers) and non-traditional responders. Volunteer role in September to October 2001 was evaluated via self-reported engagement in *only* volunteer work and no paid work activities on the rescue, recovery, and clean-up effort in that time period.

2.2.2. Psychiatric Symptoms.—Participants completed a battery of self-report symptom measures during their first annual visit; in the current study, we focused on measures evaluating PTSD, depression and alcohol misuse symptoms. The *PTSD Checklist-Specific Stressor Version (PCL-S)* [11, 12] is a 17-item, self-report instrument based on DSM-IV criteria for PTSD that was used to assess WTC-related PTSD symptoms; a PCL-S score ≥44 was used to identify probable PTSD; Cronbach's *alpha* on PCL-S items was 0.95 and 0.96 for police and non-traditional WTC responders, respectively. *The Patient Health Questionnaire-9 (PHQ-9)* [13, 14] is a nine-item screening instrument for depression, where a score of 10 or higher indicates a positive screen; Cronbach's *alpha* on PHQ-9 items was 0.89 and 0.93 for police and non-traditional WTC responders, respectively. The *CAGE* questionnaire [15] is a four-item instrument used to identify individuals with a possible alcohol problem, where a score of 2 or higher indicates a possible problem; Cronbach's *alpha* on CAGE items was 0.67 and 0.78 for police and non-traditional WTC responders, respectively.

2.2.3. Prior Psychiatric History.—Psychiatric history prior to 9/11 was assessed by asking respondents if they had ever been diagnosed by a health-care professional with depression, anxiety disorder or PTSD prior to 9/11. This variable was coded as '0' =no diagnosis or '1'=one or more of these diagnoses.

2.2.4. WTC Exposures.—WTC-related exposures were assessed via clinician-administered interview and self-report questionnaires. Exposures assessed included (1) early arrival (i.e., beginning work at the WTC worksite between 9/11–9/13/01); (2) being caught in the dust cloud from the building collapse; (3) working at or adjacent to the collapsed buildings during September 2001; (4) working more than the median number of hours on the WTC site; (5) any exposure to human remains between 9/11/01 and 6/30/02; (6) involvement in search-and-rescue efforts between 9/11/01 and 10/31/02; (7) sleeping on site; (8) traumatic death of a colleague, family member or friend on 9/11; (9) being treated for an

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

injury or illness while working on the WTC recovery effort; and (10) knowing someone who suffered an injury on 9/11. A total count of exposures was used (range 0–10).

2.2.5. Medical Conditions.—Count of medical diagnoses, made following a comprehensive examination, comprised the most common WTC-related health conditions (e.g. asthma, sinusitis, and gastroesophageal reflux). Diagnoses were included if they were made no more than 3 months following participants' first health monitoring exam.

2.2.6 Perceived Mental Health Service Needs.—Perceived mental health service needs were assessed using a self-report measure in which participants were asked, "In the next 12 months, which services do you think you might need? (Check ALL answers that apply)." Service needs included: one-to-one counseling, medication for emotional problems, nerves or sleep, stress management counseling, marriage and family counseling, religious/spiritual counseling, peer support groups, family counseling, and alcohol abuse counseling/treatment, and a "none of the above" option. As this was administered as a checklist, where no needs to many needs could be endorsed, a total count was not utilized. Endorsement of any service need was used as a categorical predictor variable. This variable and rates of endorsement of specific needs are described in detail elsewhere [10].

2.2.7 Mental Health Stigma and Barriers to Care.—Mental health stigma and barriers to care were evaluated via self-report, asking participants to respond to the following question: "Currently, what reasons would prevent you from using stress counseling/stress management services? (Check ALL answers that apply)". Seven stigma/barrier items comprised an *ad-hoc* measure that was assembled following consensus of mental health experts in the immediate aftermath of 9/11/01. The items are similar in content to those utilized in later work by Hoge et al. [6] and Britt et al. [16] Figures 1a and 1b shows the specific items that comprise this measure.

2.3. Data Analysis

Data analyses proceeded in four steps. First, item-level missing data were imputed via multiple imputation using chain equations. Second, we compared overall frequencies and total endorsement of stigma and barriers to care in police and non-traditional WTC responders. Third, we evaluated rates of stigma endorsement within a subset of police and non-traditional responders who endorsed clinically significant PTSD (PCL-S≥44), depression (PHQ≥10) and/or alcohol misuse (CAGE≥2). Fourth, we conducted multivariable binary logistic regression analyses to identify correlates of endorsement of any stigma or barrier item in the subset of responders endorsing psychiatric symptoms within occupational role (police vs. non-traditional).

3. Results

Figures 1a and 1b show percent endorsement of mental health stigma and barriers to care items in each responder group and in symptomatic subgroups, respectively. As a group, non-traditional responders (M = 0.65; SD = 1.02) endorsed more stigma/barrier items overall than police (M = 0.41; SD = 0.87), $t(12{,}399.44) = 14.10$ (95% CI: 0.20, 0.27), $p < .001$, $d = 0.25$. At the item level, 41.2% percent of non-traditional responders ($n = 2{,}584$) and 24.8%

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

of police responders (n = 1,679) endorsed at least one stigma or barrier to care item ($\chi^2(1)$ = 399.67, $p < .001$, $\phi = .18$). The most frequently endorsed item in both groups, "I would want to handle it myself," was reported by 20.4% of non-traditional responders and 13.6% of police responders. Endorsement of stigma and barriers to care was higher for six of the seven items in non-traditional responders, most notably for "I would want to handle it myself" (20.4% vs. 13.6%) and "I don't know where to go to find counseling services" (13.0% vs. 2.6%).

Exploratory analyses indicated that within the non-traditional responder group, those in the two most common occupations combined, namely construction/extraction and installation/maintenance/repair work (50.1%; n = 3,141), did not endorse more stigma and barrier to care items than those in a pooled group comprised of the other, less frequently endorsed occupations (49.9%, n = 3,131), M_{diff} = 0.02, $t(6,270) = -0.91$ (95% CI: −0.07,0.03), p = 0.36, d = 0.02. Within the non-traditional responder group, there was also no significant difference in total stigma/barriers endorsed between individuals doing only volunteer work and those who did at least some paid work on the WTC effort, M_{diff} = −0.02, $t(1626.38)$ = −0.54 (95% CI: −0.08, 0.05), p = 0.59, d = 0.02.

Within the subsample who screened positive for psychiatric disorders, the total number of stigma/barrier items endorsed did not differ between police (M = 0.90; SD = 1.17) and non-traditional (M = 0.93; SD = 1.18) responders, $t(1870.54) = 0.60$ (95% CI: −0.06, 0.11), p = .55, d = 0.03. At the item level, 50.3% of non-traditional responders and 43.7% of police responders endorsed at least one stigma or barrier to care item ($\chi^2(1) = 8.82$, $p < .001$, ϕ = −.05). The most frequently endorsed item in both groups, "I would want to handle it on my own," was reported by 20.1% of non-traditional responders and 19.2% of police responders. Police responders were more likely than non-traditional responders to endorse "Concerns that negative job consequences might result" (17.9% vs. 9.1%), while non-traditional responders were significantly more likely than police responders to endorse "I don't know where to go to find counseling services" (18.4% vs. 6.6%).

Table II shows results of multivariable regression analyses examining demographic, trauma exposure and mental health correlates of stigma or barrier endorsement within the psychiatric disorder subsample only. In police responders, greater severity of WTC exposures and WTC-related PTSD symptoms, as well as perceived mental health service need were associated with increased likelihood of endorsing at least one stigma/barrier to care item; while being married/partnered, Black, non-Hispanic race/ethnicity and having pre-9/11 psychiatric history were associated with lower likelihood of endorsement. In non-traditional responders, greater severity of WTC-related PTSD and depressive symptoms as well as perceived mental health service need were associated with increased likelihood of endorsing at least one stigma/barrier to care item; while greater age, Black, non-Hispanic race/ethnicity, higher income and pre-9/11 psychiatric history were associated with lower likelihood of endorsement.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

4. Discussion

The present study characterized the nature and correlates of mental health stigma and barriers to care in a large, population-based cohort of WTC rescue, recovery and cleanup workers. The findings indicate the presence of significant barriers to care and mental health stigma in this cohort assessed on average 5 years after the events of 9/11. Forty-one percent of the non-traditional responders and 24.8% of the police in the full sample endorsed at least one stigma or barrier to care concern. Contrary to our hypotheses, six out of seven barrier and stigma items were endorsed at higher rates in non-traditional responders, not police; the only item endorsed at higher rates in the full sample for police was fear of negative job consequences. Within the full sample of non-traditional responders, subgroup analyses on occupation and volunteer status yielded no significant effects. Finally, we found that for responders who screened positive for a psychiatric disorder, greater severity of WTC-related PTSD symptoms and having a self-reported mental health service need were associated with greater likelihood of endorsing stigma/barriers to care, while Black non-Hispanic race/ethnicity and having a pre-9/11 psychiatric history were associated with a lower likelihood of endorsing these concerns.

Placed in a broader context, the endorsement of mental health stigma/barriers to care items in WTC responders appears in some ways lower than in veterans, active-duty military, and other first responder samples. For example, Hoge et al.'s [6] survey of U.S. soldiers 3–4 months post-deployment, found that 38% of those who had active mental health symptoms endorsed not trusting mental healthcare providers; in contrast, even within our symptomatic groups, endorsement of a similarly-worded item did not exceed 9%. Similarly, concern for negative career impact was endorsed by 50% of participants in the Hoge et al. [6] study; even within our symptomatic subsample, only 17.9% of police and 9.1% of non-traditional responders endorsed this concern. Sampling differences may account for this large disparity, particularly as our participants voluntarily presented for a health-monitoring visit on average 5.5 years after 9/11/01, and not shortly following the index events. At the same time, with respect to stigma items (e.g. fear of negative job consequences), our findings were also generally below the stigma endorsement rate of 33% found in a prior meta-analytic study of first responders [9]. However, we note that most of the studies included in this meta-analysis did not assess the impact of mental health symptoms on perceptions of stigma and barriers to care. Future studies should investigate whether perceptions of stigma/barriers to care may differ currently between WTC responders and the age and symptom-matched, non-WTC exposed occupational samples, including military veterans and active service members.

Differences within responder groups are also worthy of note. The overall greater endorsement of barriers to care in the full sample of non-traditional responders compared to police was contrary to our hypotheses. It provides further clinical context to the consistent finding that non-traditional WTC responders as a group are significantly more likely to screen positive for WTC-related PTSD and have persistently symptomatic trajectories [2, 5]. In the psychiatric disorder subsample, only two group differences were found at the item level, namely more fear of negative job impact in police and more concerns around knowing where to get help in non-traditional responders. These differences speak to the need for personalized stigma/barriers to care mitigation approaches for each WTC responder

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

subgroups, and several potential interventions are discussed below. It is also important to note that having a perceived mental health service need in both symptomatic responder subgroups increased the likelihood of endorsing a barrier to care or stigma item, further reinforcing the importance of ongoing evaluation of the factors that may interfere with mental healthcare utilization.

This study has some methodological limitations. First, available archival data were through June of 2014, meaning these data may not reflect current perceptions of mental health stigma and barriers to care. As the population of WTC responders has aged, experienced worsening of health conditions, and increasingly retired, current perceptions of mental health stigma and barriers to care may be higher. Second, data regarding stigma/barriers to care are currently assessed only once, during the first annual health-monitoring exam; thus, changes over time in response to programmatic or clinical intervention cannot be examined at present. Third, clinical data were entirely based on patient self-report; follow-up studies should include standardized clinical interview assessments of symptoms to minimize reporting biases. In terms of sampling, it is also worthwhile to note that these data were drawn from a sample of consecutive first visits to a WTCHP clinic and do not capture patients who did not present for an exam, despite eligibility. This subset of responders who do not present for care may be hypothesized to experience higher stigma/barriers to care, although this possibility requires further investigation. In addition, these self-report data are typically completed at home or immediately upon arrival at WTCHP clinics. Follow-up studies are needed to investigate how stigma/barriers to care may change following interactions with medical or mental health providers during these exams. Lastly, this study does not include actual service utilization metrics, including whether responders did or did not engage with mental health services in the WTCHP following their first health monitoring visit. Bridging to prediction of care utilization is essential in future work, particularly in light of data suggesting that 24.1% of WTC responders declined mental health referral when it was offered by a clinician [17]; and, of those who accepted referral, 57.5% did not attend a treatment visit [18].

Notwithstanding these limitations, results of this study may inform the broadening of outreach and engagement efforts in clinical programs serving WTC responders. For example, educational interventions that integrate testimonials of individuals with mental illness have been found to help foster attitudinal changes, including shifts in stigma endorsement, albeit there is mixed evidence that these are sustained over the moderate to long-term [19, 20]. In addition, engagement strategies such as patient advisory groups and the inclusion of families in responder-focused educational offerings may provide opportunities to identify and address stigma and barriers, such as not knowing where to access services (a particular concern among non-traditional responders), thus increasing participation in care [21, 22]. Barriers to care in WTC responders may also be addressed through the use of synchronous or asynchronous remote mental health services, as are used in veterans' settings [23]. Self-guided digital health interventions may be particularly helpful for police officers who wish to handle problems on their own and fear potential negative job consequences of help seeking, particularly if paired with thoughtful shifts in their organizations' approach toward supporting mental health and wellness. Finally, standardized WTCHP-wide provider education to align messaging around mental health may provide additional benefits, such as

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

identification of communication styles that reinforce stigma. These interventions would supplement existing cohort-wide member outreach and education efforts within the WTCHP, including the multiple opportunities for responder contact with providers afforded by annual health monitoring and treatment services. Of note, while certain external peer support outreach programs, including Police Organization Providing Peer Assistance (POPPA)[24], are available to subgroups of WTC responders and may increase awareness of available treatment resources, quantitative data on their effectiveness to reduce mental health stigma and barriers to care have, to our knowledge, not been published. Future research is needed to examine the impact of systemic and individual-level interventions on stigma and barriers to care in WTC-exposed rescue, recovery and cleanup workers, with attention paid to the non-traditional responder groups. Furthermore, as seen in prior work by the WTC Health Registry [4] utilizing waves of large-scale cohort surveys, future research on treatment barriers should also include WTC survivors - those individuals, broadly encompassed, who were living, working or going to school in Lower Manhattan on 9/11/01.

In conclusion, the present study examined rates and correlates of mental health stigma and barriers to care in a large-scale occupational cohort of World Trade Center rescue, recovery and cleanup workers. Non-traditional responders were found to endorse mental health stigma and barriers at higher rates than police responders. In a subset of WTC responders who screened positive for a psychiatric disorder, the need for specific program-level interventions was highlighted by the finding that having a self-rated mental service need was associated with a greater likelihood of endorsing at least one barrier/stigma item. Several areas for further research include the need for longitudinal research on stigma/barriers in the WTC cohort, the impact of personalized interventions and outreach on reducing barriers to care within responder subgroups, and examination of the relationship between stigma/barriers and actual mental health service utilization within the World Trade Center Health Program. These findings from a WTC responder sample may be more broadly applicable in light of recent events to address the needs and barriers of a similarly heterogenous group of traditional frontline health care workers (e.g. nurses/nurse practitioners and physicians) and support staff (e.g. environmental and food services workers) responding to the ongoing COVID-19 pandemic[25].

Acknowledgements:

The authors would like to thank all the World Trade Center rescue, recovery and cleanup workers participating in this study. The authors would also like to acknowledge the assistance of the WTC General Responder Data Center.

Funding: This study was supported by the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (Research Contracts 200-2011-41919 and 200-2017-93325). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC/NIOSH. This funding source had no role in study design; in the collection, analysis and interpretation of data; in the writing of the report; nor in the decision to submit the paper for publication.

Disclosure (Authors): Dr. Feder is named co-inventor on an issued patent in the United States, and several issued patents outside the U.S., filed by the Icahn School of Medicine at Mount Sinai (ISMMS) for the use of ketamine as a therapy for PTSD. This intellectual property has not been licensed. Dr. Schechter has received consulting fees from Accolade, Inc., for analysis of claims data in evaluation of the effectiveness of their services and for technical support provided to in-house statistical staff. Dr. Southwick receives book royalties from Cambridge University Press. Drs. DePierro, Haugen, Lowe, Todd, Crane, Harrison, Udasin, Luft, Moline, and Ms. Schaffer, Mr. Dasaro and Mr. Cancelmo report no competing interests.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Data Availability Statement/Data Accessibility Statement: The data that support the findings of this study are available from the WTC Health Program General Responder Data Center (GRDC) at Mount Sinai. Restrictions apply to the availability of these data, which were used under license for this study. Data are available with the permission of the GRDC (Contact christopher.dasaro@mssm.edu).

References

1. Dasaro CR, Holden WL, Berman KD, et al. Cohort profile: world trade center health program general responder cohort. International journal of epidemiology. 2015;46(2):e9–e9.
2. Pietrzak RH, Feder A, Singh R, et al. Trajectories of PTSD risk and resilience in World Trade Center responders: an 8-year prospective cohort study. Psychological Medicine. 2014;44(1):205–219. [PubMed: 23551932]
3. Pietrzak RH, Feder A, Schechter C, et al. Dimensional structure and course of posttraumatic stress symptomatology in World Trade Center responders. Psychological medicine. 2014;44(10):2085–2098. [PubMed: 24289878]
4. Ghuman SJ, Brackbill RM, Stellman SD, Farfel MR, Cone JE. Unmet mental health care need 10–11 years after the 9/11 terrorist attacks: 2011–2012 results from the World Trade Center Health Registry. BMC public health. 2014;14(1):491. [PubMed: 24885506]
5. Feder A, Mota N, Salim R, et al. Risk, coping and PTSD symptom trajectories in World Trade Center responders. Journal of psychiatric research. 2016;82:68–79. [PubMed: 27468166]
6. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. New England Journal of Medicine. 2004;351(1):13–22.
7. Pietrzak RH, Johnson DC, Goldstein MB, Malley JC, Southwick SM. Perceived stigma and barriers to mental health care utilization among OEF-OIF veterans. Psychiatric services. 2009;60(8):1118–1122. [PubMed: 19648201]
8. Corrigan P How stigma interferes with mental health care. American psychologist. 2004;59(7):614–625.
9. Haugen PT, McCrillis AM, Smid GE, Nijdam MJ. Mental health stigma and barriers to mental health care for first responders: A systematic review and meta-analysis. Journal of psychiatric research. 2017;94:218–229. [PubMed: 28800529]
10. Diab O, DePierro J, Cancelmo L, et al. Mental Healthcare Needs in World Trade Center Responders: Results from a Large, Population-Based Health Monitoring Cohort. Administration and Policy in Mental Health and Mental Health Services Research. 2019:1–8. [PubMed: 29948427]
11. Weathers FW, Litz BT, Herman DS, Huska JA, Keane TM. The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. San Antonio, TX.; 1993:
12. Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA. Psychometric properties of the PTSD Checklist (PCL). Behaviour research and therapy. 1996;34(8):669–673. [PubMed: 8870294]
13. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. Journal of general internal medicine. 2001;16(9):606–613. [PubMed: 11556941]
14. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. Psychiatric annals. 2002;32(9):509–515.
15. King M At risk drinking among general practice attenders: validation of the CAGE questionnaire. Psychological medicine. 1986;16(1):213–217. [PubMed: 3961046]
16. Britt TW, Greene–Shortridge TM, Brink S, et al. Perceived stigma and barriers to care for psychological treatment: Implications for reactions to stressors in different contexts. Journal of Social and Clinical Psychology. 2008;27(4):317–335.
17. Jayasinghe N, Giosan C, Difede J, Spielman L, Robin L. Predictors of responses to psychotherapy referral of WTC utility disaster workers. Journal of Traumatic Stress. 2006;19(2):307–312. [PubMed: 16612826]
18. Jayasinghe N, Spielman L, Cancellare D, Difede J, Klausner E, Giosan C. Predictors of treatment utilization in world trade center attack disaster workers: role of race/ethnicity and symptom severity. International journal of emergency mental health. 2005;7(2):91–99. [PubMed: 16107041]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

19. Thornicroft G, Mehta N, Clement S, et al. Evidence for effective interventions to reduce mental-health-related stigma and discrimination. The Lancet. 2016;387(10023):1123–1132.

20. Mehta N, Clement S, Marcus E, et al. Evidence for effective interventions to reduce mental health-related stigma and discrimination in the medium and long term: systematic review. The British Journal of Psychiatry. 2015;207(5):377–384. [PubMed: 26527664]

21. Angstman KB, Bender RO, Bruce SM. Patient advisory groups in practice improvement: sample case presentation with a discussion of best practices. The Journal of ambulatory care management. 2009;32(4):328–332. [PubMed: 19888009]

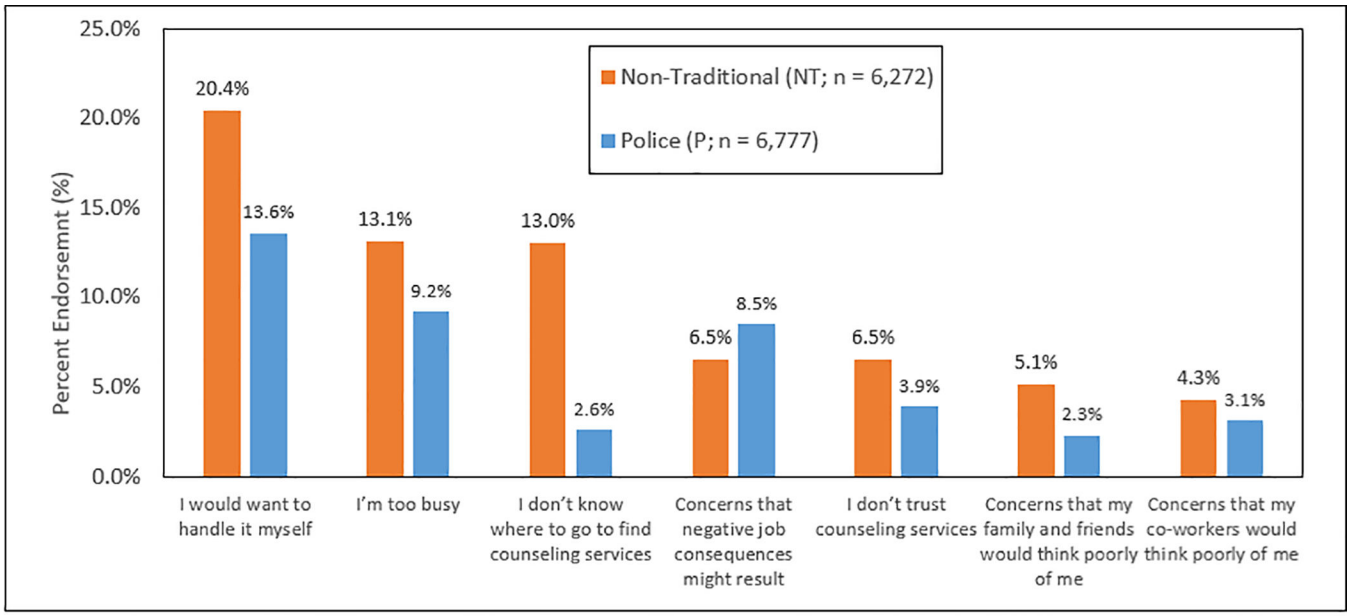
22. Bennett WL, Pitts S, Aboumatar H, et al. Strategies for Patient, Family, and Caregiver Engagement. Agency for Healthcare Research and Quality; 2020. Accessed September 18, 2020. https://www.ncbi.nlm.nih.gov/books/NBK561680/pdf/Bookshelf_NBK561680.pdf

23. Deen TL, Godleski L, Fortney JC. A description of telemental health services provided by the Veterans Health Administration in 2006–2010. Psychiatric Services. 2012;63(11):1131–1133. [PubMed: 23117510]

24. Dowling FG, Genet B, Moynihan G. A confidential peer-based assistance program for police officers. Psychiatric services. 2005;56(7):870–871. [PubMed: 16020823]

25. DePierro J, Lowe S, Katz C. Lessons learned from 9/11: Mental health perspectives on the COVID-19 pandemic. Psychiatry Research. 2020:113024.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript



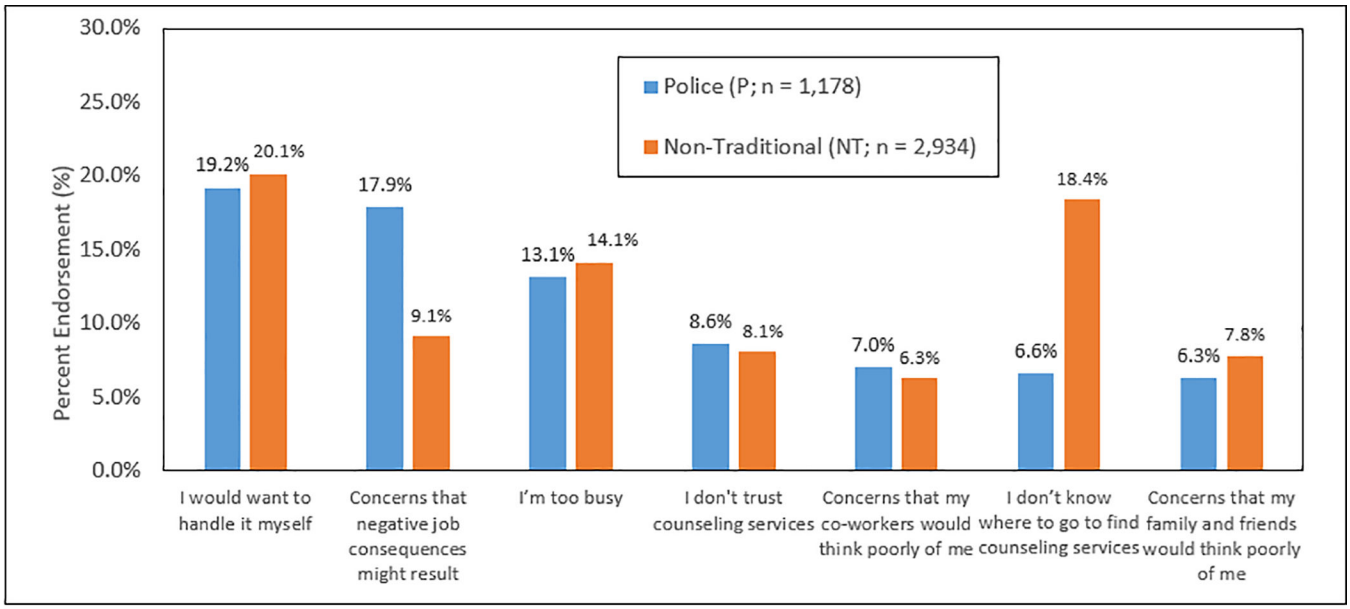
n endorsed: NT P	1233 891	770 591	767 164	375 549	378 251	292 146	251 198
X^2	103.94	47.83	473.21	65.44	40.91	65.44	12.61
p-value	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**	**<.001**
ES (φ)	.09	.06	.20	.04	.06	.07	.03

Figure 1a).

Stigma and barrier endorsement in the full sample of World Trade Center responders

Note: Total valid *n*s per item vary slightly due to missing data

Author Manuscript Author Manuscript Author Manuscript Author Manuscript



n endorsed: P	226	211	154	101	82	78	74
NT	590	267	414	239	184	541	229
X^2	0.00	70.61	0.00	0.72	3.58	80.10	1.65
p-value	.96	**<.001**	.96	.41	.22	**<.001**	.23
ES (φ)	.00	.14	.14	.02	.02	-.15	.02

Figure 1b).

Stigma and barrier endorsement in a subsample of World Trade Center responders screening positive for psychiatric disorders

Note: Total valid *n*s per item vary slightly due to missing data

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table I:

Overall police and non-traditional responder sample descriptive statistics

	Police (n=6,777)	Non-traditional (n=6,272)
	M(SD)/n(%)	M(SD)/n(%)
Age	42.03 (7.05)	45.84 (10.00)
Gender		
Male (ref)	5,672 (84%)	5,384 (86%)
Female	1,105 (16%)	888 (14%)
Marital status		
Never married (ref)	938 (14%)	951 (15%)
Married or partnered	4,491 (66%)	3,860 (62%)
Widowed, divorced, separated	1,348 (20%)	1,461 (23%)
Race/ethnicity		
White, non-Hispanic (ref)	2,633 (39%)	2,727 (44%)
Black, non-Hispanic	679 (10%)	559 (9%)
Hispanic	1,305 (19%)	1581 (25%)
Other	299 (4%)	263 (4%)
Missing	1,861 (28%)	1,142 (18%)
Income		
<=80,000 (ref)	3,373 (50%)	3,547 (57%)
>80,000	2,023 (30%)	1,008 (16%)
Missing	1,381 (20%)	1,717 (27%)
Education		
Less than HS (ref)	66 (1%)	797 (13%)
HS grad or higher	6,711 (99%)	5,475 (87%)
Pre-9/11 psychiatric history	452 (7%)	899 (14%)
Volunteer Status (September-October 2001)		
Volunteer work only	192 (3%)	1114 (18%)
Some or only paid work	6463 (95%)	4810 (7%)
Missing	122 (2%)	348 (5%)

Am J Ind Med. Author manuscript; available in PMC 2022 March 01.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

	Police (n=6,777)	Non-traditional (n=6,272)
	M(SD)/n(%)	M(SD)/n(%)
WTC exposures (0–10)	4.79 (1.88)	3.37 (1.87)
WTC medical conditions (0–3)	0.67 (0.80)	0.59 (0.79)
Mental health symptoms		
PTSD (PCL-S)	26.67 (12.31)	38.49 (17.45)
Depression (PHQ-9)	3.12 (4.30)	7.24 (6.79)
Alcohol (CAGE)	0.28 (0.71)	0.76 (1.19)
Time since 9/11/01 (years)	5.18 (2.33)	4.81 (2.18)
Any mental health service need	1,493 (22%)	3,005 (49%)

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table II:

Prediction of any stigma/barrier to care in police and non-traditional responders screening in for psychiatric disorders

	Police (n=1,178)		Non-traditional (n=2,934)	
	M(SD)/n(%)	**OR (95% CI)**	**M(SD)/n(%)**	**OR (95% CI)**
Age	43.68 (7.42)	0.99 (0.97–1.01)	45.69 (9.92)	0.98 (0.98–0.99)
Gender				
Male (ref)	969 (82%)		2460 (84%)	
Female	209 (18%)	0.93 (0.64–1.34)	474 (16%)	0.90 (0.72–1.13)
Marital status				
Never married (ref)	161 (14%)		462 (16%)	
Married or partnered	672 (57%)	0.59 (0.39–0.88)	1605 (55%)	1.06 (0.84–1.33)
Widowed, divorced, separated	345 (29%)	0.79 (0.51–1.24)	867 (30%)	1.04 (0.80–1.33)
Race/ethnicity				
White, non-Hispanic (ref)	421 (50%)		1201 (49%)	
Black, non-Hispanic	142 (17%)	0.53 (0.37–0.76)	229 (9%)	0.70 (0.52–0.95)
Hispanic	223 (27%)	1.05 (0.75–1.49)	910 (37%)	1.02 (0.83–1.24)
Other	53 (6%)	1.23 (0.66–2.32)	115 (5%)	1.09 (0.72–1.64)
Income				
<=80,000 (ref)	584 (64%)		1704 (83%)	
>80,000	319 (35%)	1.02 (0.75–1.39)	337 (17%)	0.86 (0.68–1.09)
Education				
Less than HS (ref)	20 (2%)		463 (16%)	
HS grad or higher	1158 (98%)	0.74 (0.27–2.06)	2471 (84%)	1.22 (0.98–1.52)
Pre-9/11 psychiatric history	252 (29%)	0.53 (0.37–0.76)	631 (27%)	0.74 (0.60–0.90)
WTC exposures (0–10)	5.36 (1.84)	1.05 (0.97–1.13)	3.50 (1.97)	1.00 (0.96–1.05)
WTC medical conditions (0–3)	0.84 (0.90)	1.01 (0.87–1.17)	0.64 (0.83)	0.95 (0.86–1.06)
Mental health symptoms				
PTSD (PCL-S)	47.41 (15.36)	1.02 (1.00–1.03)	53.20 (14.77)	1.01 (1.01–1.02)
Positive screen: PCL-S ≥44	745 (63%)		2,256 (77%)	
Depression (PHQ-9)	9.89 (5.98)	1.03 (1.00–1.05)	12.55 (6.49)	1.03 (1.01–1.05)
Positive screen: PHQ ≥10	580 (49%)		1831 (62%)	

Am J Ind Med. Author manuscript; available in PMC 2022 March 01.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

	Police (n=1,178)		Non-traditional (n=2,934)	
	M(SD)/n(%)	**OR (95% CI)**	**M(SD)/n(%)**	**OR (95% CI)**
Alcohol (CAGE)	0.83 (1.17)	0.96 (0.85–1.08)	0.84 (1.29)	1.06 (1.00–1.13)
Positive screen: CAGE≥2	367 (31%)		816 (28%)	
Time since 9/11/01 (years)	6.07 (2.45)	1.00 (1.00–1.00)	5.61 (2.34)	1.00 (1.00–1.00)
Any mental health service need	2396 (82%)	1.99 (1.48–2.67)	817 (69%)	1.58 (1.28–1.95)

Note: Outcome variable is categorical endorsement of one or more of the seven stated barriers to care and stigma items (yes/no). Symptomatic status based on positive endorsement on PCL-S, PHQ9 and/or CAGE.